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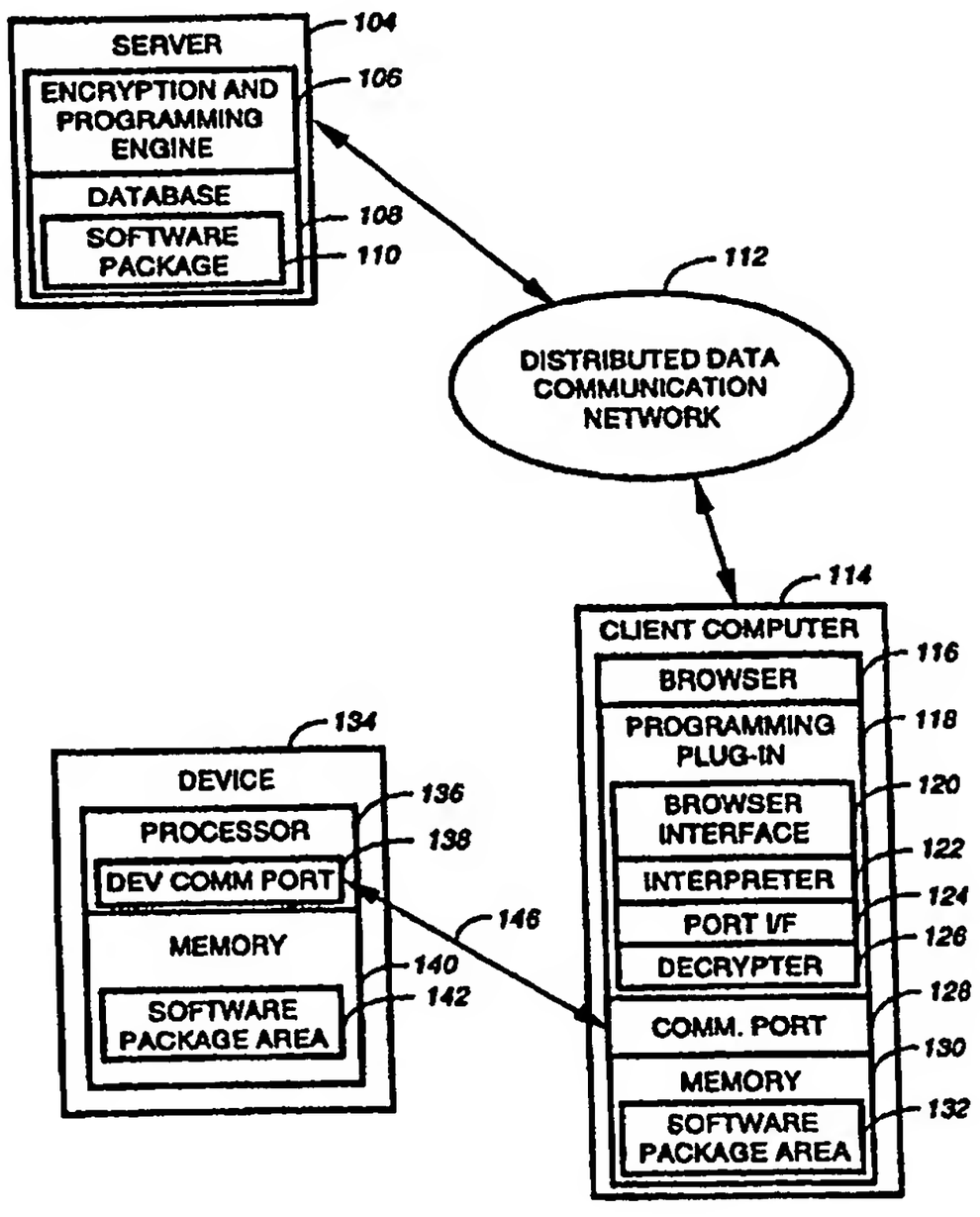
(54) Title: METHOD AND APPARATUS FOR PROGRAMMING A DEVICE WITH A SOFTWARE PACKAGE OBTAINED OVER A DISTRIBUTED DATA COMMUNICATION NETWORK

(57) Abstract

A database (108) is created (202) including a software package (110) on a server (104) accessible from a distributed data communication network (112), and a programming plug–in (118) is created and installed (204) for use with a browser (116) on a computer (114). The programming plug–in is for providing compatible communications between the browser and a communication port (128) of the computer. The database is accessed (206) through the distributed data communication network by utilizing the browser to obtain (208) the software package, and a device (134) is coupled (210) to the communication port of the computer. The programming plug–in then programs (214) the device with the software package through the communication port in cooperation with the device.



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METHOD AND APPARATUS FOR PROGRAMMING A DEVICE WITH A SOFTWARE PACKAGE OBTAINED OVER A DISTRIBUTED DATA COMMUNICATION NETWORK

Field of the Invention

This invention relates in general to remote programming of software controlled devices, and more specifically to a method and apparatus for programming a device with a software package obtained over a distributed data communication network.

Background of the Invention

Electronic devices are becoming increasingly dependent upon software to control features and functionality. As new features and functionality are added, new versions of the software are needed for making the new features and functionality operational. Until now, software upgrades for most devices have been left to the factory, warranty depot, or repair center, due to complexity and security issues associated with remote programming of the devices.

Aggravating the problem, software flexibility has created an explosion of new options with each new revision. When major new revisions are released, warranty and repair centers can get flooded with devices needing an upgrade. In addition, with so many options and features, the process of communicating which features and options the user desires can become tedious and error-prone.

What is needed is a method and apparatus that allows a user of an electronic device to obtain a software upgrade without having to send the device to the factory, warranty depot, or repair center. Preferably, the method and apparatus will be simple and easy to use, and will allow the user to quickly select the desired features and options. In addition, the method an apparatus must be secure, so that the upgrades cannot be stolen by unauthorized persons.

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Summary of the Invention

An aspect of the present invention is a method for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of accessing the distributed data communication network. The method comprises the steps of creating a database comprising the software package on a server accessible from the distributed data communication network, and creating and installing a programming plug-in for use with a browser on a computer, the programming plug-in for providing compatible communications between the browser and a communication port of the computer. The method further comprises the steps of accessing the database through the distributed data communication network by utilizing the browser to obtain the software package, and coupling the device to the communication port. The method further comprises the step of programming the device with the software package obtained by the browser, the programming performed by the programming plug-in through the communication port in cooperation with the device.

Another aspect of the present invention is a programming plug-in for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of accessing the distributed data communication network, wherein a database exists comprising the software package on a server accessible from the distributed data communication network, and wherein the database is accessed through the distributed data communication network by utilizing a browser to obtain the software package. The programming plug-in comprises a browser interface for providing communications between the programming plug-in and the browser on a computer, and an interpreter coupled to the browser interface for providing compatible communications between the browser and the device. The programming plug-in further comprises a port interface coupled to the interpreter and coupled to a communication port for programming the device with the software package through the communication port in cooperation with the device.

Another aspect of the present invention is a computer for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of

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accessing the distributed data communication network, wherein a database exists comprising the software package on a server accessible from the distributed data communication network. The computer comprises a browser for accessing the database through the distributed data communication network to obtain the software package, and a programming plug-in coupled to the browser and coupled to a communication port for providing compatible communications between the browser and the communication port. The computer further comprises the communication port coupled to the device for communicating with the device. The programming plug-in comprises a browser interface for providing communications between the programming plug-in and the browser, and an interpreter coupled to the browser interface for providing compatible communications between the browser and the device. The programming plug-in further comprises a port interface coupled to the interpreter and coupled to the communication port for programming the device with the software package through the communication port in cooperation with the device.

Brief Description of the Drawings

FIG. 1 is an electrical block diagram of a system for programming a device in accordance with the present invention.

FIG. 2 is a flow diagram depicting a method for programming a device in accordance with the present invention.

FIG. 3 is an exemplary diagram of an on-screen form for selecting options and features in accordance with the present invention.

Detailed Description of the Drawings

Referring to FIG. 1, an electrical block diagram depicts a system for programming a device 134 in accordance with the present invention. The system comprises a server 104, constructed of conventional computer system hardware, coupled, e.g., by a telephone line, to a distributed data communication network 112, e.g., the Internet, for communicating with the distributed data communication network 112. The server 104 preferably is programmed, using well-known techniques, with at least one functional access page, e.g., a World Wide Web page, which can be

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accessed via the network 112. The server 104 further comprises an encryption and programming engine 106 for programming the server 104 in accordance with the present invention and for encrypting data comprising a software package 110 before transmitting the data over the network 112. The encryption and programming engine 106 preferably utilizes a well-known encryption technique, such as the Data Encryption Standard (DES). The software package 110 resides in a database 108 that has been created on the server 104. It will be appreciated that the database 108 can comprise more than one software package 110, depending upon the number of different types of devices, features, and options supported.

The system of FIG. 1 further comprises at least one client computer 114, constructed of conventional computer system hardware, coupled, e.g., by a telephone line, to the distributed data communication network 112 for programming the device 134 with the software package 110 by obtaining the software package over the network 112. The computer 114 comprises a browser 116, e.g., a conventional Web browser, for accessing the database 108 through the distributed data communication network 112 to obtain the software package 110.

Usually Internet based applications are shielded from the client computer's local resources for security purposes, but recently developed plug-in Application Programming Interfaces (APIs) now allow programmers to access the local resources through native code. A specially coded browser plug-in can detect the transmission of a file with special extensions that identify the file type. The software package 110, for example, can be sent using special encoding identified through a predetermined Multipurpose Internet Mail Extension (MIME) type. This determines the type of transmission used to download the information and categorizes the information so that the browser 116 can identify the data being sent and trigger the programming plug-in 118 to process the data. A plug-in of this type can, for example, display a dialog box alerting the user to connect the device 134 to the computer 114. Upon acknowledgment, the plug-in 118 can take control of the device 134 through the device's communication port 138.

The computer 114 further comprises the programming plug-in 118 coupled to the browser 116 and coupled to a communication port 128 for providing compatible communications between the browser 116 and the communication port 128 in accordance with the present invention. The

programming plug-in 118 includes a browser interface 120 for providing communications between the programming plug-in 118 and the browser 116. The programming plug-in 118 also includes an interpreter 122 coupled to the browser interface 120 for providing compatible communications between the browser 116 and the device 134. In addition, the programming plug-in 118 includes a port interface 124 coupled to the interpreter 122 and coupled to the communication port 128 for programming the device 134 with the software package 110 through the communication port 128. The programming plug-in 118 further comprises a decryptor 126 coupled to the interpreter 122 for decrypting the software package 110 when communicating the software package 110 to the device 134. The software of the programming plug-in 118 can be readily written by one of ordinary skill in the art, given the teachings of the instant disclosure.

The computer 114 further comprises the communication port 128 coupled to the device 134 for communicating with the device 134. The computer 114 also includes a memory 130 having a software package area 132 for storing the software package 110 after downloading the software package 110 from the server 104. The communication port 128 of the computer 114 is coupled to the device communication port 138 by a programming link 146. The device 134 preferably comprises a processor 136 for utilizing the software package 110 and for downloading the same from the client computer 114, utilizing well-known techniques. The processor 136 comprises the device communication port 138 and is coupled to a memory 140, e.g., a conventional electrically erasable programmable read only memory (EEPROM) having a software package area 142 for storing the software package 110. Examples of devices 134 that can benefit from the present invention include pagers, cellular telephones, portable digital assistants, portable two-way radios, and television setup devices, to name a few.

Referring to FIG. 2, a flow diagram 200 depicting a method for programming a device in accordance with the present invention begins with creating 202 the database 108 comprising at least one software package 110 on the server 104. In addition, the programming plug-in 118 is created and installed 204 on the client computer 114 for use with the browser 116, the programming plug-in 118 for providing compatible communications between the browser 116 and the communication port

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128. Once the system is operational, a user of the device 134 can access 206 the database 108 through the distributed data communication network 112 by utilizing the browser 116 to obtain the software package 110. The user then selects 208 the options and features to be included in the software package 110, preferably utilizing an on-screen form, and the server 104 then downloads the customized software package 110 to the software package area 132 of the client computer 114. The user then couples 210 the device 134 to the communication port 128 in preparation for programming the device 134. Next, through a command sequence, e.g., entered through a keyboard of the computer 114 using well-known techniques, the user indicates to the browser 116 and to the programming plug-in 118 that the device 134 is to be programmed with the software package 110. In response the browser 116 retrieves the software package 110 from the software package area 132 of the memory 130, and passes the software package 110 to the programming plug-in 118, which decrypts 212 the software package 110 and passes the decrypted software package 110 to the communication port 128. The communication port 128 communicates the software package 110 to the device 134 through the device communication port 138, so that the processor 136 can program 214 the device with the software package 110, using well-known techniques.

Referring to FIG. 3, an exemplary diagram 300 of a Web page comprising an on-screen form to aid the user in selecting options and features in accordance with the present invention depicts spaces 302, 304 to enter a model number and a serial number. The diagram further depicts conventional hyperlinks 306, 308 for viewing additional similar Web pages to obtain further information about features and options and for selecting pre-programmed feature/option packages and starting a download utilizing well-known techniques. It will be appreciated that there can be many variations of the on-screen form that will work as well for selecting the options and features to download.

It should now be apparent that the present invention advantageously provides a method and apparatus that allows a user of an electronic device to obtain a software upgrade without having to send the device to the factory, warranty depot, or repair center. The method and apparatus is simple and easy to use, and will allow the user to quickly select the desired features and options. In addition, the method an apparatus is secure, so that the upgrades cannot be stolen by unauthorized

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persons. The method and apparatus advantageously provides a centralized point at which new features and options can be provided as they become available, thereby preventing inventory from becoming obsolete due to software revision.

While the foregoing has disclosed by way of example an embodiment in accordance with the present invention, it will be appreciated that many alternative embodiments in accordance with the present invention may occur to one of ordinary skill in the art, given the teachings of this disclosure. Consequently, the scope of the invention is delimited only according to the following claims.

What is claimed is:

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CLAIMS

1. A method for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of accessing the distributed data communication network, the method comprising the steps of:

creating a database comprising the software package on a server accessible from the distributed data communication network;

creating and installing a programming plug-in for use with a browser on a computer, the programming plug-in for providing compatible communications between the browser and a communication port of the computer;

accessing the database through the distributed data communication network by utilizing the browser to obtain the software package;

coupling the device to the communication port; and

programming the device with the software package obtained by the browser, the programming performed by the programming plug-in through the communication port in cooperation with the device.

2. The method of claim 1,

wherein the database is protected by a data encryption engine, and

wherein the programming step comprises the step of decrypting the software package.

3. The method of claim 1,

wherein the distributed data communication network is an Internet-like network, and

wherein the accessing step comprises the step of utilizing a Web browser.

4. The method of claim 1, wherein the accessing step comprises the step of selecting options and features to be included in the software package.

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5. The method of claim 1, wherein the accessing step comprises the step of making selections from an on-screen form.

6. A programming plug-in for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of accessing the distributed data communication network, wherein a database exists comprising the software package on a server accessible from the distributed data communication network, and wherein the database is accessed through the distributed data communication network by utilizing a browser to obtain the software package, and wherein the programming plug-in comprises:

a browser interface for providing communications between the programming plug-in and the browser on a computer;

an interpreter coupled to the browser interface for providing compatible communications between the browser and the device; and

a port interface coupled to the interpreter and coupled to a communication port for programming the device with the software package through the communication port in cooperation with the device.

7. The programming plug-in of claim 6,

wherein the database is protected by a data encryption engine for encrypting the software package, and

wherein the programming plug-in further comprises a decryptor coupled to the interpreter for decrypting the software package.

8. The programming plug-in of claim 6,

wherein the distributed data communication network is an Internet-like network, and

wherein the browser interface is a Web browser interface.

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9. A computer for programming a device with a software package obtained over a distributed data communication network, the device itself incapable of accessing the distributed data communication network, wherein a database exists comprising the software package on a server accessible from the distributed data communication network, the computer comprising:

a browser for accessing the database through the distributed data communication network to obtain the software package;

a programming plug-in coupled to the browser and coupled to a communication port for providing compatible communications between the browser and the communication port; and

the communication port coupled to the device for communicating with the device,

wherein the programming plug-in comprises:

a browser interface for providing communications between the programming plug-in and the browser;

an interpreter coupled to the browser interface for providing compatible communications between the browser and the device; and

a port interface coupled to the interpreter and coupled to the communication port for programming the device with the software package through the communication port in cooperation with the device.

10. The computer of claim 9,

wherein the database is protected by a data encryption engine for encrypting the software package, and

wherein the programming plug-in further comprises a decryptor for decrypting the software package.

11. The computer of claim 9,

wherein the distributed data communication network is an Internet-like network, and

wherein the browser interface is a Web browser interface.

12. The computer of claim 9, wherein the browser is arranged to cooperate with the server to provide for selecting options and features to be included in the software package.

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13. The computer of claim 9, wherein the browser is arranged to cooperate with the server to provide for making selections from an on-screen form.

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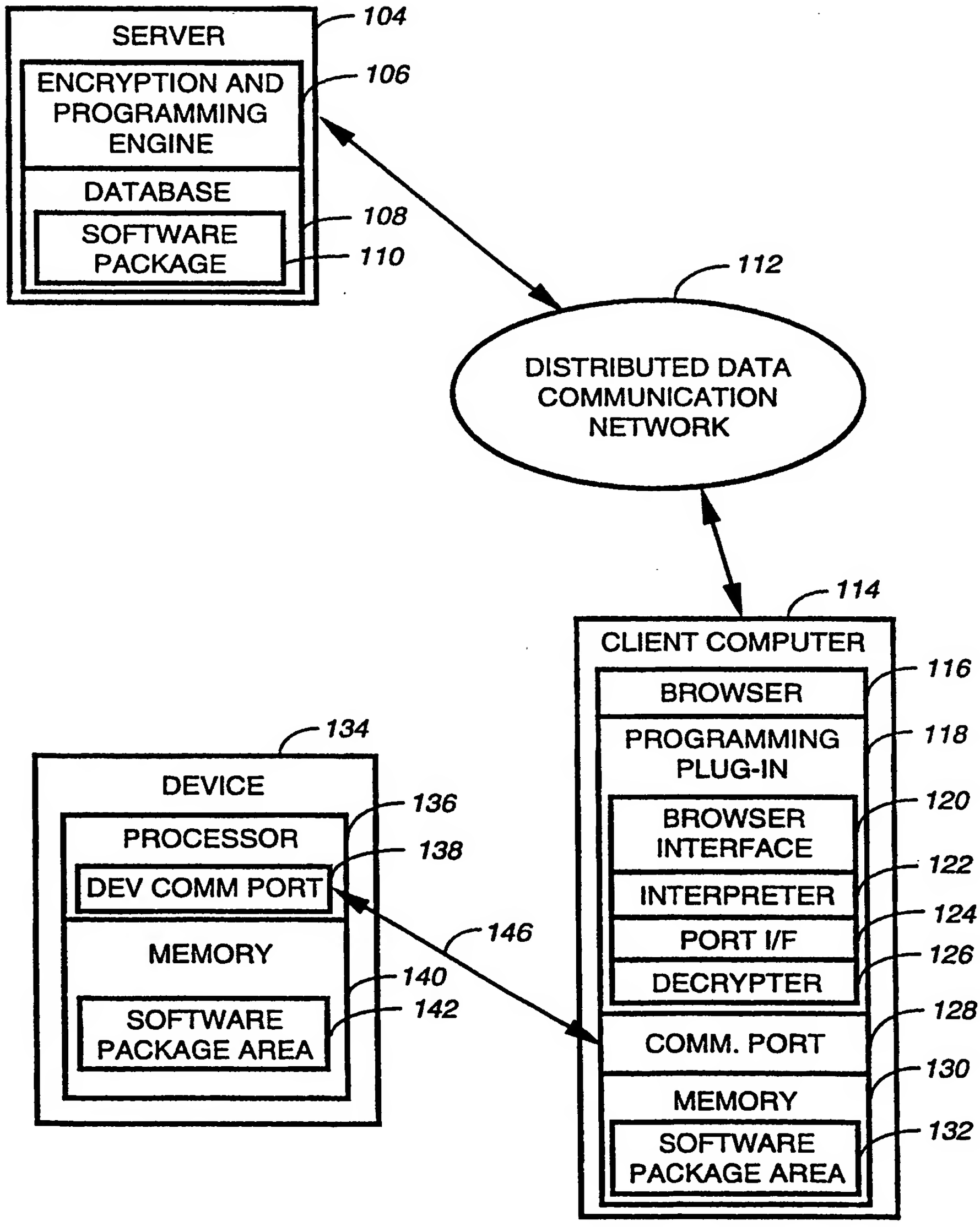

FIG. 1

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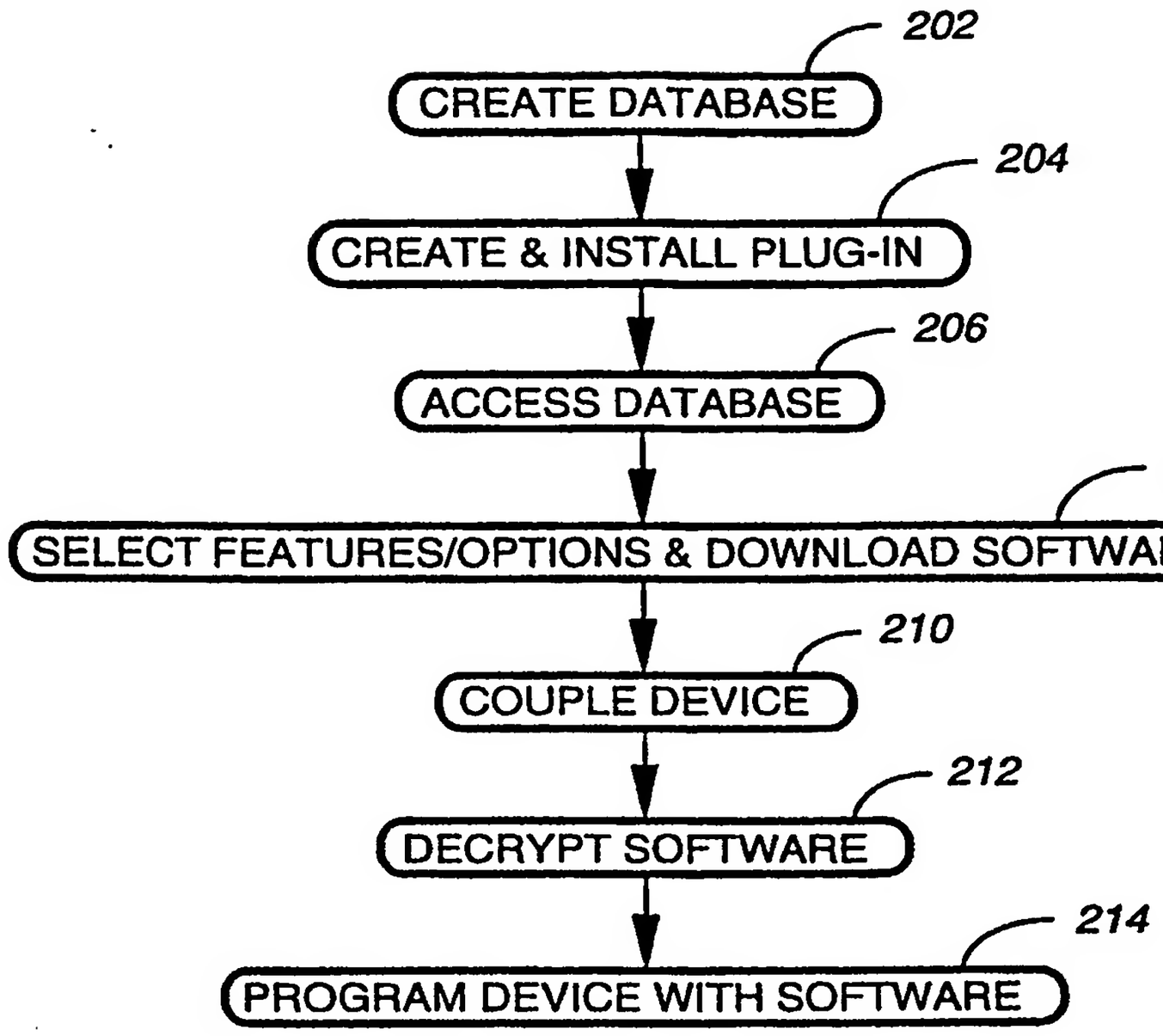

FIG. 2 **200**

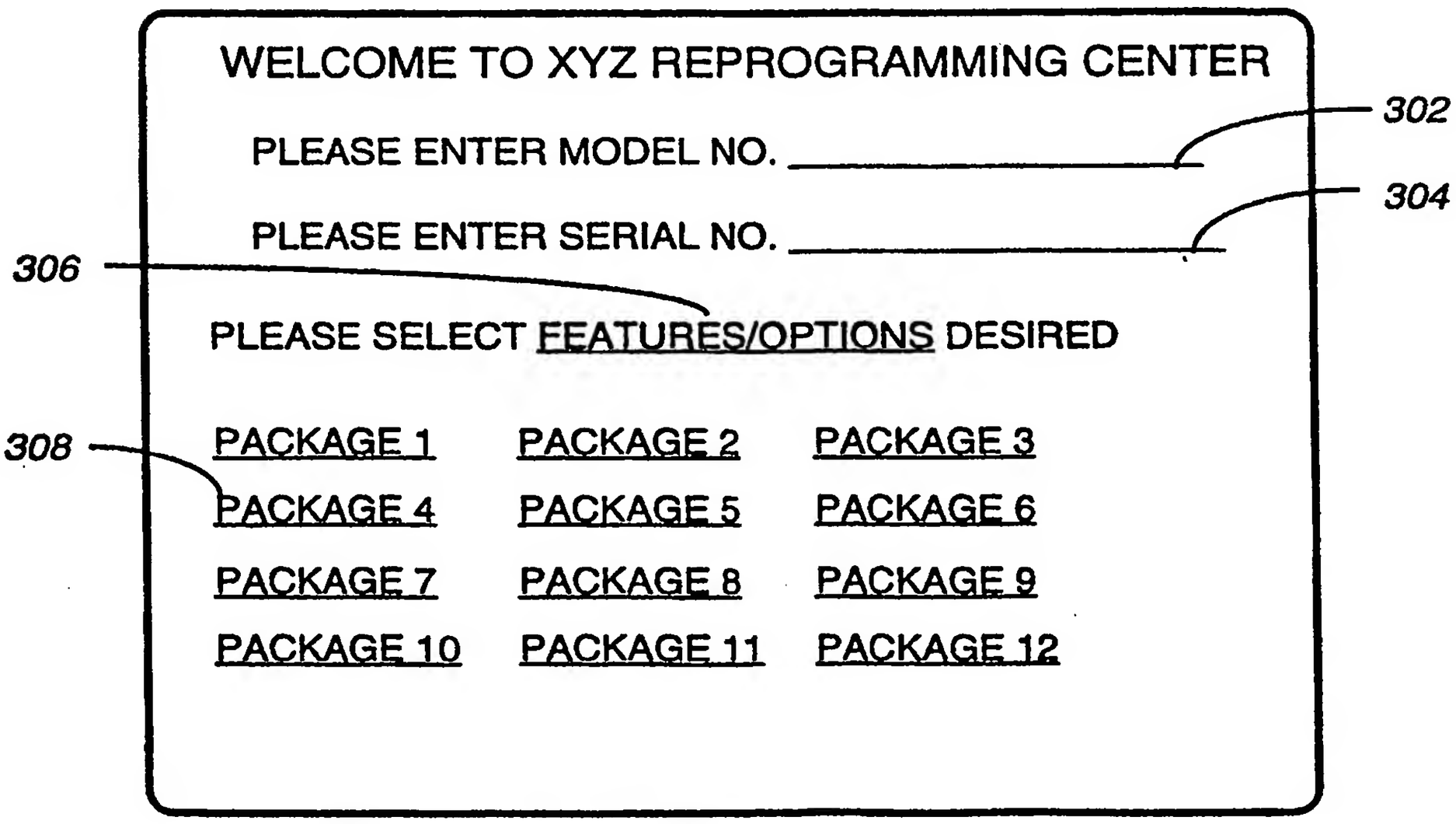

FIG. 3 **300**

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US98/03026

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :G06F 9/24, 12/22, 13/10
US CL :380/4, 49; 395/680

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 380/4, 49; 395/680

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

APS : browser, programming device, plug "in", communication port

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,410,598 A (SHEAR) 25 APRIL 1995, see col. 10, lines 10-22.	1, 2, 9, 10.
A	US 5,060,295 A (BORRAS et al) 22 OCTOBER 1991, see col. 2, lines 13-33.	1, 6, 9.
A	US 5,379,404 A (RASOR) 03 JANUARY 1995, see col. 2, lines 13-33.	1, 6, 9.
A,P	US 5,694,399 A (JACOBSON et al) 02 DECEMBER 1997, see col. 2, lines 11-37.	1, 6, 9.

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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